(No Model.) 2 Sheets—Sheet 1.

H. GÖHRIG.

WATER TUBE STEAM BOILER.

No. 600,069. Patented Mar. 1, 1898.

Fig. 1.

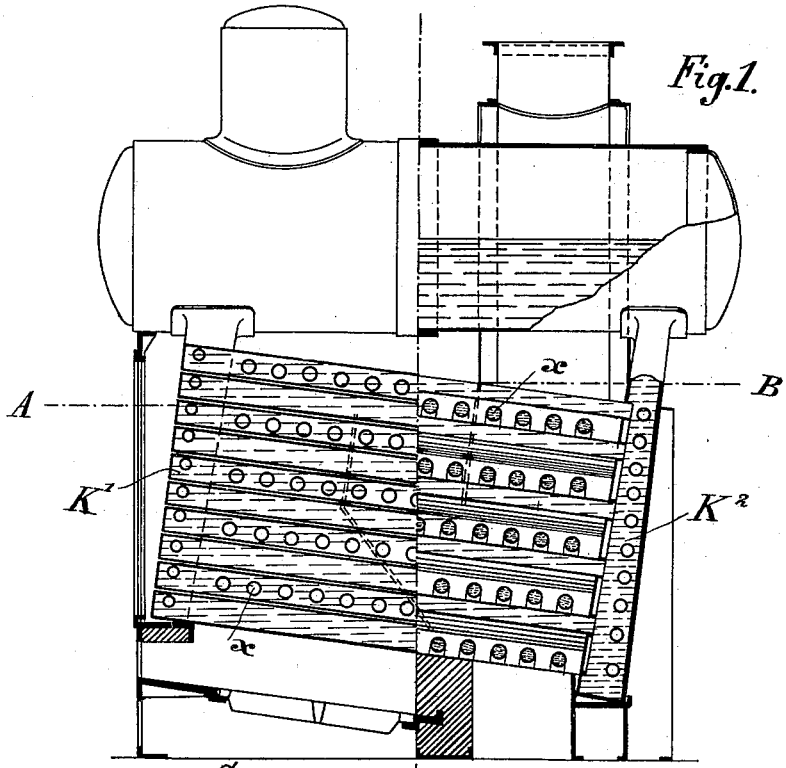
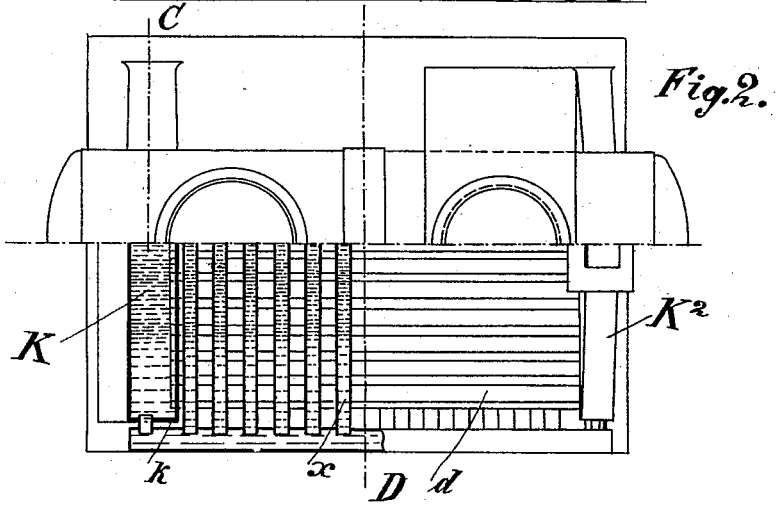


Fig. 2.



Witnesses:
Herbert Lawson.
Alfred Robertson

Inventor:
H. Göhrig
by Alexander & Dowell
his Attys.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

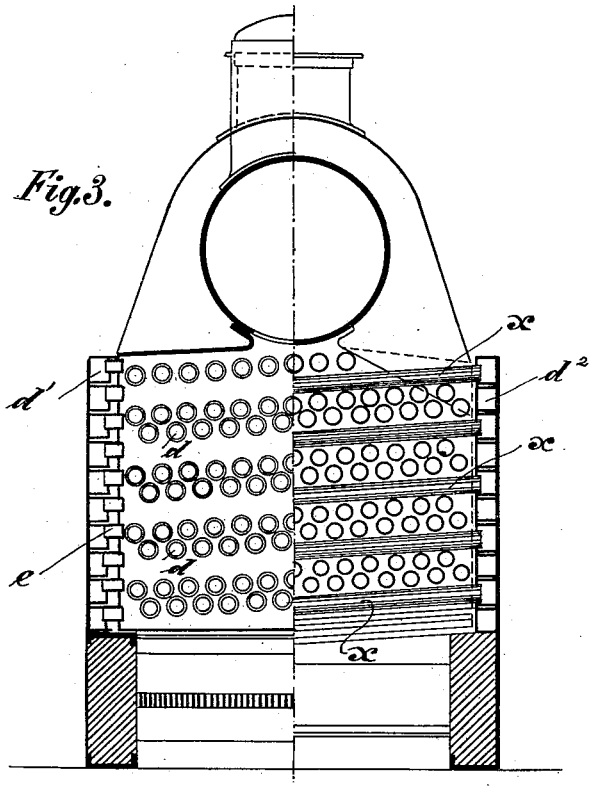


Fig. 4.

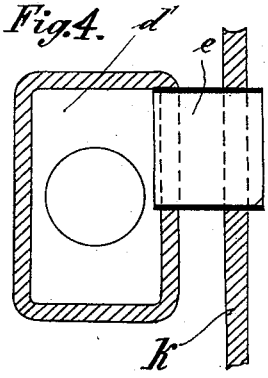
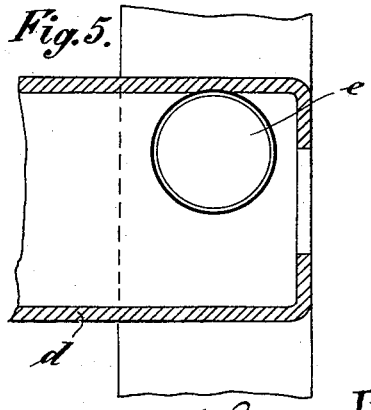


Fig. 5.



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UNITED STATES PATENT OFFICE.

HEINRICH GÖHRIG, OF DARMSTADT, GERMANY.

WATER-TUBE STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 600,069, dated March 1, 1898.

Application filed December 23, 1896. Serial No. 616,731. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH GÖHRIG, a subject of the Grand Duke of Hesse, and a resident of Darmstadt, in the Grand Duchy of Hesse, in the German Empire, have invented Improvements in or Connected with Water-Tube or Tubulous Steam-Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention consists in improvements in water-tube boilers in which the side walls consist of separate pipes or drums placed close together one above the other and connected to the front and rear water-chambers. Boilers of this description as heretofore made were constructed with these pipes arranged between the water-chambers and connected direct with the end walls of the same. Because the pipes were arranged closely one above the other it was necessary, in order to connect each pipe with the end plates of the water-chambers, to narrow down alternately either one end or the other of the pipes. This construction is adopted in the Steinmüller boilers. In another construction the ends of the pipes are bent so as to obtain sufficient room in the end walls for connecting the pipes with the said walls. This arrangement is adopted in the Dürr boilers. Neither of these arrangements, however, recommended itself in practice, because, in the first place, a cleaning of the pipes in consequence of the narrowing down of the ends was rendered impossible, and, in the second place, the removal of an inlet-pipe was frequently only effected with the greatest difficulty. Also the places of connection of these side pipes with the water-chambers were in direct contact with the flame, and because the pipes with narrowed-down ends could in any case be but imperfectly cleaned, and the burning through of such pipes took place within a short period. By my present invention all these disadvantages are obviated by the fact that the tubes forming the side walls of the boiler are not connected with the end plates of the water-chambers, but with the narrow outer side walls of the chambers by means of short tubes, so that the replacing of either one or the other, as also the cleaning of the pipes, can be effected in the simplest possible manner. The places of connection are beyond the reach of the flame.

A boiler furnished with these improvements is shown in the accompanying drawings, in which—

Figure 1 is a vertical section of a boiler-furnace. Fig. 2 is a plan view thereof, partly in section; and Fig. 3 is a cross-section on line C D of Fig. 2.

The side walls of the boiler are, as before mentioned, formed by the system of pipes d' d^2, which can be of any desired cross-section, but are most advantageously made either round or quadrangular. If round pipes are used, they can have their ends formed of square section, as shown in Fig. 3. These pipes are connected with the side walls k of the water-chambers K' K² by means of short transverse tubes e, which are preferably flanged into side walls k of the water-chambers and into the tubes d' d^2. These tubes are located beyond the reach of the flames, and by cutting out the tubes e the pipes can be easily replaced, and, moreover, can be easily cleansed in a simple manner, because they are of the same cross-section throughout.

The substance of the invention as applied to a water-tube boiler in which the side walls are formed of hollow pipes or drums is the connection of the pipes with the narrow side walls of the front and rear water-chambers by means of short tubes for the purposes of first locating the connections of the side pipes and the water-chambers out of the reach of the flame, and thereby lessening the liability of explosion, and, in the second place, to enable an easy cleaning of such side pipes.

Having thus described my invention, what I therefore claim as new, and desire to secure by Letters Patent thereon, is—

1. In a boiler the combination of the front and rear water-chambers, and a series of pipes forming the side walls, with short tubes connecting said pipes to the said chambers, said

tubes being located out of the reach of the flames and permitting easy cleansing of the pipes, and their removal and replacement.

2. In a boiler the combination with the front and rear water-chambers as K′, K², and the side walls formed of systems of pipes d', d^2, substantially as described; with the series of short tubes e connecting the extremities of pipes d', d^2, to the sides of chambers K′, K², all substantially as and for the purpose described.

HEINRICH GÖHRIG.

Witnesses:
WILLY SCHENTZ,
FERDINAND SAHLL.